

Weekly Report

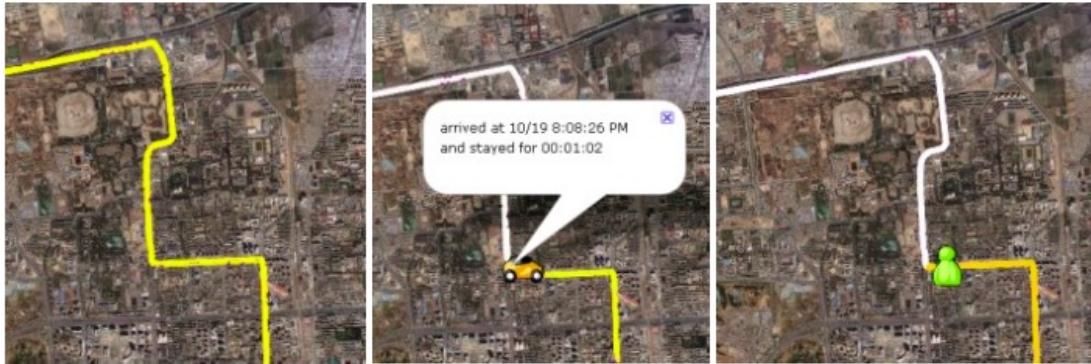
12/08/2014-12/14/2014

Reserach

1. I have found the reason why nvidia driver restart when I running cuda program. There is a feature of windows operation system called Timeout Detection and Recovery which detects response problems from a graphics card and resetting the card. If the operating system does not receive a response from a graphics card within a certain amount of time (default is 2 seconds), the operating system resets the graphics card. The computer at cad has already set TdrDelay to 60 seconds, so program works well if gpu complete program in 60s. However, the program computes slower than matlab, and sometimes longer than 60s for special parameter.

2. I read some papers about gps data this week.

- Anomaly Detection in GPS Data Based on Visual Analytics[1]. In this paper, Zicheng Liao et al introduce GPS Visual Analytics System to detecs anomalies in GPS data using conditional random field. Human expert can observe the real-time data behavior and further provide guidance to improve the machine learning model.
- Learning Transportation Mode from Raw GPS Data for Geographic Applications on the Web[4]. Raw GPS data are still used directly without much understanding. In this paper, an approach based on supervised learning is proposed to automatically infer transportation mode from raw GPS data Fig.1.
- Measuring Social Functions of City Regions from Large-scale Taxi Behaviors[3]. In this paper, we establish and confirm the relationship between the get-on/off characteristics of taxi passengers and the social function of city regions.



(a) Before inference (b) Stop at parking lot (c) Switch to walk

Figure 1: (a) only provides us some basic location information. (b) and (c) provide richer knowledge discovered over the plain track.

- Map-Matching for Low-Sampling-Rate GPS Trajectories[2]. Authors propose a novel global map-matching algorithm called ST-Matching for low-sampling-rate GPS trajectories Fig.2.
- Other papers concentrate on detecting anomalous taxi trajectories and predicting traffic conditions, but have no relationship with visualization.

Plan for next week

- I plan to read more papers about taxi gps data and mobile data visualization .
- Learn EM algorithm.

References

- [1] Zicheng Liao, Yizhou Yu, and Baoquan Chen. Anomaly detection in gps data based on visual analytics. In *Visual Analytics Science and Technology (VAST), 2010 IEEE Symposium on*, pages 51–58. IEEE, 2010.
- [2] Yin Lou, Chengyang Zhang, Yu Zheng, Xing Xie, Wei Wang, and Yan Huang. Map-matching for low-sampling-rate gps trajectories. In *Proceedings of the 17th*

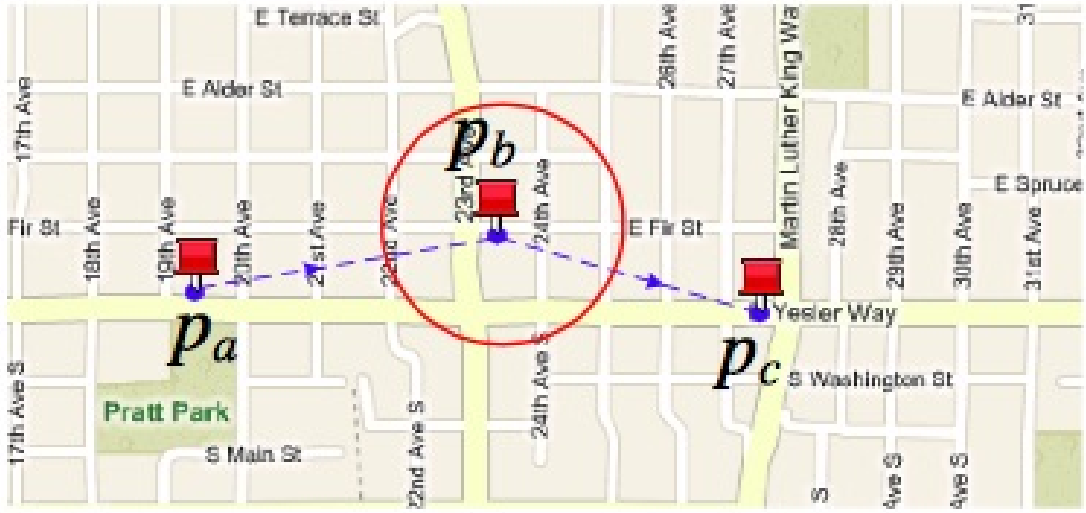


Figure 2: P_b should be matched to the horizontal road rather than its nearest road.

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- [3] Guande Qi, Xiaolong Li, Shijian Li, Gang Pan, Zonghui Wang, and Daqing Zhang. Measuring social functions of city regions from large-scale taxi behaviors. In *Pervasive Computing and Communications Workshops (PERCOM Workshops)*, 2011 IEEE International Conference on, pages 384–388. IEEE, 2011.
- [4] Yu Zheng, Like Liu, Longhao Wang, and Xing Xie. Learning transportation mode from raw gps data for geographic applications on the web. In *Proceedings of the 17th international conference on World Wide Web*, pages 247–256. ACM, 2008.